

Claims

What is claimed is:

1. A turbine engine exhaust diffuser having a tunable exhaust velocity profile, comprising:

5 an outer boundary member extending along a central axis;
an inner boundary member located radially-inward of said outer boundary member and extending along said central axis;
an exhaust flowpath disposed between said outer and inner boundary members;
a flow deflecting member disposed within said flowpath, said flow deflecting
10 member longitudinally dividing said flowpath into a first region characterized by a first predetermined velocity profile and a second region characterized by a second predetermined velocity profile, said second predetermined velocity profile being determined by at least one pre-selected dimension of said flow deflecting member.

15 2. The turbine engine exhaust diffuser of Claim 1, wherein said flow deflecting member is adapted to produce a substantially-uniform radial distribution of fluid within said second region.

3. The turbine engine exhaust diffuser of Claim 1, wherein said flow deflecting
20 member is adapted to produce a radially-outward-biased radial distribution of fluid within said second region.

4. The turbine engine exhaust diffuser of Claim 3, wherein said flow deflecting member is adapted to direct up to about twenty-five % of fluid flowing through said second
25 region toward said outer boundary member.

5. The turbine engine exhaust diffuser of Claim 1, wherein said flow deflecting member is a substantially-continuous component extending circumferentially around said inner boundary member.

5

6. The turbine engine exhaust diffuser of Claim 5, wherein said flow deflecting member extends radially away from said central axis a distance effective to divert fluid flowing through said flowpath toward said outer boundary sleeve.

10 7. The turbine engine exhaust diffuser of Claim 1, wherein said flow deflecting member includes a guide surface adapted to direct fluid flowing therepast toward said outer boundary sleeve.

8. The turbine engine exhaust diffuser of Claim 7, wherein said guide surface is
15 substantially-linear.

9. The turbine engine exhaust diffuser of Claim 8, wherein said guide surface forms an angle with said central less than about forty-five degrees.

20 10. The turbine engine exhaust diffuser of Claim 1, wherein said inner boundary sleeve includes a non-tapered first portion characterized by a first outer radius measured from said central axis and a tapered second portion, said flow deflecting member being disposed within said second portion.

11. The turbine engine exhaust diffuser of Claim 10, wherein said flow deflecting member extends radially away from said central axis by a second outer radius substantially equal to said first outer radius.

5 12. The turbine engine exhaust diffuser of Claim 10, wherein said flow deflecting member extending radially away from said central axis by a second outer radius smaller than said first outer radius.

13. The turbine engine exhaust diffuser of Claim 10, wherein said flow deflecting
10 member extending radially away from said central axis by a second outer radius larger to said first outer radius.

14. The turbine engine exhaust diffuser of Claim 1, wherein said flowpath includes a first zone adapted to induce a first pressure drop within fluid passing therethrough and a
15 second zone adapted to induce a second pressure drop within fluid passing therethrough.

15. The turbine engine exhaust diffuser of Claim 14, wherein said flow deflecting member is located within said second zone.

20 16. A method of improving heat recovery steam generator (HRSG) heat extraction performance comprising:

providing a combined cycle industrial gas turbine engine having a turbine section and a HRSG section fluidly linked by an exhaust diffuser assembly defining a flowpath therebetween, said exhaust diffuser assembly dividing said flowpath into a first region
25 having a first predetermined velocity profile and a second region having second predetermined velocity profile;

providing a flow deflecting member within said exhaust diffuser assembly, said flow deflecting member being adapted to ensure said second predetermined velocity profile is characterized by a substantially-uniform radial distribution.

- 5 17. A method of extending heat recovery steam generator (HRSG) lifespan comprising:

providing a combined cycle industrial gas turbine engine having a turbine section and a HRSG section fluidly linked by an exhaust diffuser assembly defining a flowpath therebetween, said exhaust diffuser assembly dividing said flowpath into a first region
10 having a first predetermined velocity profile and a second region having second predetermined velocity profile;

providing a flow deflecting member within said exhaust diffuser assembly, said flow deflecting member being adapted to ensure said second predetermined velocity profile is characterized by a radially-outward-biased distribution.